

REMARKS

Claims 1, 7, and 39-42, are all the claims pending in the application. Claim 38 has been canceled without prejudice or disclaimer. New claims 39-42 have been added to further define the invention. Please note that this Amendment has been formatted according to the Revised Format Now Permitted and, therefore, waiver of 37 C.F.R. § 1.121 is requested.¹ Reconsideration and allowance of all the claims are respectfully requested in view of the following remarks.

Personal Interview

Applicants thank the Examiner for the courtesy extended to their personal representative during the personal interview conducted on April 22, 2003. During the interview, the Examiner and Applicants' personal representative discussed the differences between the presently claimed invention and the prior art cited by the Examiner. The response below implements themes of the discussion and, therefore, no further summary is believed to be necessary.

Election/Restriction

As a result of Applicants' election of the Fig. 1 species, and Fig. 6B subspecies, the Examiner has withdrawn claims 2-6 and 8-37 from consideration. New claims 39 and 40 are generic to all the species, whereas new claims 41 and 42 further define the subject matter shown in Fig. 6B. Therefore, new claims 39-42 should be examined with the elected claims.

Specification

1) The Examiner objected to the specification as including informalities. Specifically, the Examiner asserted that on page 24, line 15, the terms “φ0.5” and “C0.7” are not clearly understood. Applicants respectfully traverse this rejection because these terms of art would be readily recognized by one of ordinary skill. The term “φ” stands for --diameter--, as is well

¹ See Pre-OG Notices as posted on the PTO website at www.uspto.gov/web/offices/pac/dapp/opla/preognotice/revamdtprac.htm.

understood in the art, and is given in the units of mm, the same as the unit for thickness of a distribution plate 47 described on page 24, lines 13-14. The term "C", as in "C0.7", means "cutting" and represents the cutting configuration as shown in attached Exhibit A denoting an enlarged portion of Fig. 6B. Again, this is a term of art that would be readily recognized by one of ordinary skill, and is given in the units of mm. In light of the foregoing, this objection is believed to be in error, and should be withdrawn.

Claim Objections

2) The Examiner objected to the claims because the lines are crowded too closely together. In response, Applicants have used the new permitted amendment form to set forth all currently pending claims and, thus, set them forth with proper spacing.

Claim Rejections - 35 USC §112

3) The Examiner rejected claims 1, 7, and 38, under § 112, 2nd paragraph, as indefinite. Specifically, the Examiner asserted that the claim 38 limitations of "the heating medium channels", "the fuel channels", and "the heat medium channels", lack proper antecedent basis. In response, Applicants have corrected the various typographical errors giving rise to this rejection. Accordingly, this rejection is believed to have been overcome.

Claim Rejections - 35 USC §102

4) The Examiner rejected claim 38 under § 102(b) as being anticipated by US Patent 4,216,820 to Andrew (hereinafter Andrew). In as much as the Examiner may now attempt to apply this rejection to new claims 39 and 40, Applicants respectfully traverse this rejection because Andrew fails to disclose every element as set forth and arranged in Applicants' claims.

Claim 39 sets forth a heat exchanger comprising a heating medium channel, a fuel channel, a fuel supply plate provided above the heating medium channel, the fuel supply plate having means for passing the liquid fuel by drops, and avoiding means for preventing the liquid fuel drops, flown out from the means for passing, from being mixed with each other.

For example, as shown in Figs. 1, 6A and 6B, one embodiment of the present invention is a heat exchanger comprising a heating medium channel 23a, 19a, a fuel channel 23b, 19b, a fuel supply plate 47 provided above the heating medium channel, the fuel supply plate having a means for passing the liquid fuel by drops, and means for preventing the liquid fuel drops, flown out from the means for passing, from being mixed with each other. Due to this arrangement, when the liquid fuel B falls down onto the first heat exchanger body 23, flows of the liquid fuel B are once collected in by the surface tension of the liquid fuel B because the means for preventing is formed in the outlet portions of the means for passing. Then, the liquid fuel B falls down. Thus, drops of the liquid fuel B are prevented from joining each other. As a result, the liquid fuel is supplied to the whole area of the heat exchanger more uniformly, so that the heat exchanger can exert its function satisfactorily.²

In contrast, Andrew discloses a liquid distribution system wherein distributor ports 52 convey liquid from upper chamber 74 to diverging outlets 54 for directing the liquid onto the sheets 48. But the diverging outlets 54 associated with one distributor port 52 are isolated from any other such diverging outlets 54. That is, as shown in Fig. 3, it is the sheets 48, spacing members 46, and vertical side plates 44, that prevent the liquid from adjacent ones of the distributor ports 52 from mixing with each other; neither the distributor ports 52 nor the diverging outlets 54 pass the liquid fuel by drops. Accordingly, Andrew fails to anticipate claim 39.

With respect to claim 40, Andrew fails to disclose a fuel battery.

For at least any of the above reasons, claims 39 and 40 are not anticipated by Andrew. Likewise, the dependent claims are not anticipated by this reference.

5) The Examiner rejected claims 1, 7, and 38, under §102(b) as being anticipated by US Patent 4,599,097 to Petit et al. (hereinafter Petit). Applicants respectfully traverse this rejection, in as much as the Examiner may attempt to apply it to new claims 39 and 40, by because Petit fails to disclose every element as set forth and arranged in Applicants' claims.

² Specification at page 25, line 16 - page 25, line 3.

Again, claim 39 sets forth a fuel supply plate having a means for passing the liquid fuel by drops.

In contrast to that set forth in claim 39, Petit discloses bars 28 having vertical apertures 29 therein. However, Petit discloses that the function of the apertures 29 is to 'distribute the liquid oxygen in a fine and uniform manner.³ Further, the function of the counter bore 29A is to make the section for the passage of the liquid oxygen of a short length so that it is thereby less subject to stopping up or to undesirable vaporization. Further, Petit discloses that the openings issue "jets of liquid".⁴ There is no disclosure of avoiding mixing, or passing the fuel by drops. Accordingly, Petit fails to disclose a fuel supply plate having a means for passing the liquid fuel by drops, as set forth in claim 39.

Petit also fails to disclose a fuel battery, as set forth in claim 40.

For at least any of the above reasons, Petit fails to anticipate claims 39 and 40. Likewise, Petit fails to anticipate the dependent claims. However, Applicants respectfully traverse this rejection as it applies to claim 1 for the following additional reasons.

Claim 1 sets forth that the avoiding portions are formed by a chamfer on a circumferential edge of a fuel-outflow-side opening portion of each of the plurality of holes. For example, as shown in Figs. 6A and B, one embodiment of the invention comprises chamfers 63 disposed on a circumferential edge of each of the plurality of holes 61.

In contrast to that set forth in claim 1, Petit discloses apertures 29 having a counterbore 29A. And as shown in Figs. 4 and 5, the counterbore 29A is straight; it does not include any chamfer. Accordingly, Petit fails to disclose a chamfer as set forth in claim 1.

6) The Examiner rejected claims 1, 7, and 38, under §102(b) as being anticipated by US Patent 5,944,094 to Kinney, Jr. et al. (hereinafter Kinney). Applicants respectfully traverse this rejection, in as much as the Examiner may attempt to apply it to claims 39 and 40, because Kinney fails to disclose every element as set forth and arranged in Applicants' claims.

³ Petit at col. 6, lines 18-19.

⁴ Petit at col. 1, line 59 - col. 2, line 3.

Again, claim 39 sets forth a fuel supply plate having means for passing the liquid fuel by drops.

Kinney discloses a heat exchanger including a diffuser 50 comprising troughs 124 with slots 126 at the bottom thereof. As shown in Figs. 8-12, the troughs 124 are separated from one another, and have the slots 126 at the bottom thereof. However, Kinney fails to disclose that the troughs 124 or slots 126 pass the liquid fuel by drops. Instead, Kinney's slot-type holes are sized and arranged so as to pass liquid in sheets.

Kinney also fails to disclose a fuel battery as set forth in claim 40.

For at least any of the above reasons, Kinney fails to anticipate claims 39 and 40. Likewise, the dependent claims are not anticipated by this reference. Nonetheless, Applicants respectfully traverse this rejection as it applies to claim 1 for the following additional reasons.

With respect to claim 1, Kinney fails to disclose every element as set forth and arranged. Again, claim 1 sets forth that the avoiding portions are formed by a chamfer on a circumferential edge of a fuel-outflow-side opening portion of each of the plurality of holes. In contrast to that set forth in claim 1, Kinney discloses slots 126 disposed at the bottom of tapered troughs 124. See Fig. 11. That is, the slots 126 themselves are not chamfered. Accordingly, Kinney fails to disclose a plurality of holes, wherein a circumferential edge of each of the plurality of holes is chamfered, as set forth in claim 1.

Conclusion

New claims 41 and 42 have been added to further define the invention. Claims 41 and 42 recite further definition of the chamfers set forth in claim 1 and, therefore, should be allowable at least by virtue of their dependency.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Amendment Under 37 C.F.R. § 1.111
U.S. Appln No. 09/966,288

Atty. Dkt No. Q66472

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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PATENT TRADEMARK OFFICE

Date: April 29, 2003



EXHIBIT

A

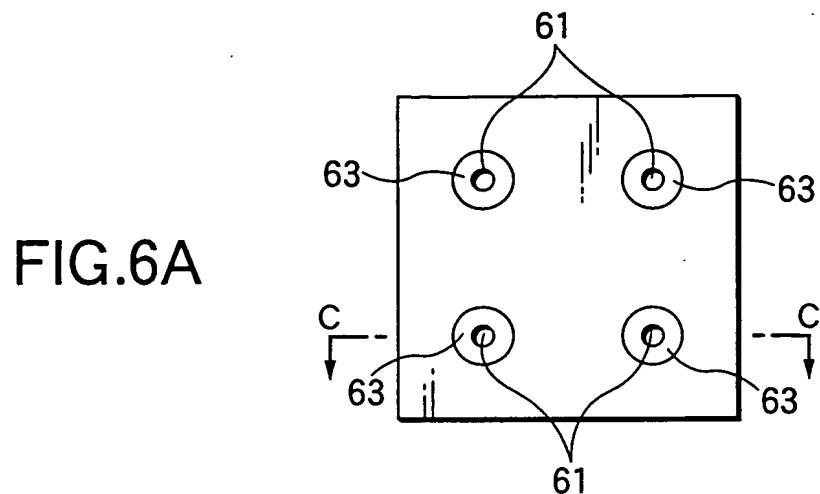


FIG.6A

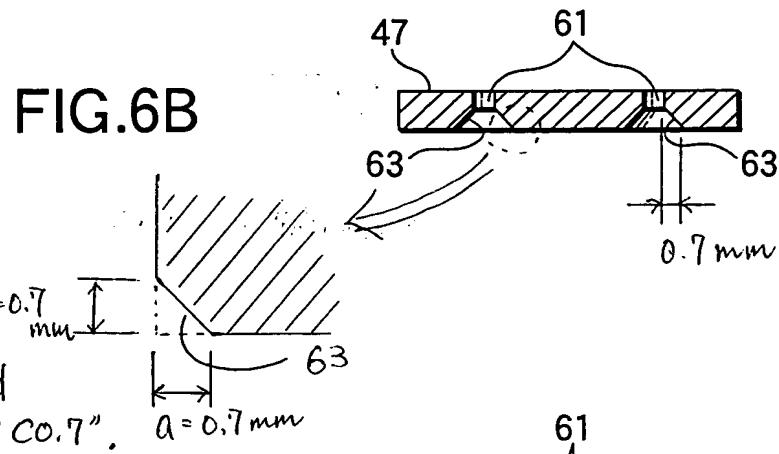


FIG.6B

FIG.7A

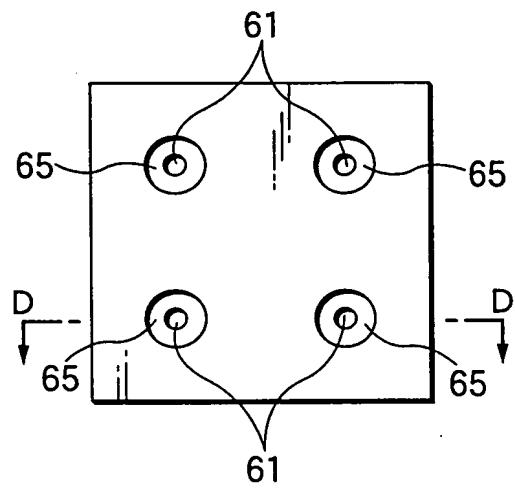


FIG.7B

